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ABSTRACT

An unfamiliar or strange situation was used as a setting to highlight individual differences in an infant's responses to brief separations from his mother and his reactions to a stranger. Two groups were observed, one composed of 23 white, middle class mother-infant pairs, the other of 33 pairs. Eight episodes, presented in fixed order for all pairs, were used in which a baby faced an unfamiliar environment and also a stranger, both when his mother was present and when she was absent. Detailed conclusions are drawn from the test situations for three groups of mother-infant pairs: (1) babies whose mothers were sensitive to their needs and with whom there was harmonious interaction; (2) babies whose mothers consistently rejected them and with whom there was an unharmonious relationship; and (3) babies whose mothers interfere and also ignore them, but in which maternal rejection is either moderate or masked. (MK)

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Individual Differences in Strange-Situation Behaviour of One-year-olds[1]

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INTRODUCTION

In recent years several studies of human development have used an unfamiliar or strange situation as a setting in which to observe systematically the effect of the presence and absence of a mother-figure on the response of infants or young children to strangeness or other fear-arousing stimuli (Cox and Campbell, 1968; Collard, 1968; Rosenthal, 1967a, 1967b; Schwarz, 1968; Rheingold, 1969). In the course of a naturalistic longitudinal study of the development of infant-mother attachment, we introduced our subjects to a novel situation which was designed specifically to highlight individual differences in infants' responses. We were interested especially in the extent to which an infant could use his mother as a secure base from which to explore, in his reaction to a stranger, and in his response to brief separation from his mother. Since our situation was intended as a test, a standard procedure was followed with all subjects. The situation was composed of eight episodes, presented in fixed order, in which the baby faced an unfamiliar environment and also a stranger both when his mother was present and when she was absent.

The strange-situation procedure proved powerful in disclosing individual differences in regard to the three classes of behaviour for which it had been originally designed. Furthermore, it has emerged as a test situation well suited to a sensitive examination of the strength and quality of the attachment behaviour an infant directs towards his mother when under stress, as well as to an assessment of the balance between such attachment behaviour and exploratory behaviour.

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1 The extended project which yielded the data herein reported was supported by grant 62-244 of the Foundations' Fund for Research in Psychiatry, and by USPHS grant RO1 HD 01712. That support is gratefully acknowledged. The present classification of individual differences in strange-situation behaviour and the system of scoring of interactive behaviour therein was devised while the senior author was a fellow of the Center for Advanced Study in the Behavioral Sciences, and also owes much to discussion with fellow participants in a seminal chaired by John Bowlby at the Department of Psychiatry, Stanford University, in 1968. We also appreciate help given by the following in various aspects of the collection or analysis of the data: George D. Allyn, Mary P. Blehar, John Conklin, Elizabeth A. Eikenberg, Edwin E. Ellis, William C. Hamilton, Andrea Jacobson, Mary B. Main, Robert S. Marvin II, Eleanor S. McCulloch, and Donna Murphy. Special acknowledgment is made to Barbara A. Wittig who also helped in the original planning of the strange situation.

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For some time it has seemed useful to view an attachment figure as providing a secure base from which a child may venture forth to explore the world (Blatz, 1966; Salter, 1940; Ainsworth, 1963, 1967; Harlow, 1958). The more inclusive concept of a balance between exploratory and attachment behaviour followed from Bowlby's (1969) control-systems account of the dynamic equilbrium of mother-infant interaction and from several excellent accounts of mother-infant interaction in nonhuman primate species both in the field and in captive colonies (e.g. Hinde et al., 1964; van Lawick-Goodall, 1968; DeVore, 1963). The model of an attachment-exploration balance focuses on two sets of behavioural systems, each with significant species-survival functions, which operate in dynamic equilibrium. Attachment behaviours, which constitute the first system, serve to promote the proximity of infant to mother, and are dovetailed into reciprocal maternal behaviours, such as retrieving. Attachment behaviour includes not only signalling behaviours, such as smiling, crying, and vocalizing, of which even a very young infant is capable, but also, later, more active behaviours such as approaching, following, reaching, grasping, and clinging. Exploratory behaviours, which constitute the second behavioural system, include locomotion, manipulation, visual exploration, and exploratory play, which promote acquisition of knowledge of the environment and adaptation to environmental variations. On some occasions, the infant ventures away from his mother in order to explore interesting features of his surroundings; on other occasions he seeks to be near his mother or in actual physical contact with her, so that, over time, his expeditions away from her alternate with, and are in some kind of balance with, his return to her. The balance is tipped towards exploration by complex, novel, and/or changing features of the environment, provided these are not so sudden, intense, or strange as to provoke alarm. The balance is tipped towards proximity-seeking by a number of conditions, both intra-organismic and environmental. Important among the environmental conditions which heighten a child's attachment behaviour are alarm - including alarm at the merely strange - and threatened or actual separation from his mother.

In the first episodes of the strange-situation procedure used in this study the balance is tipped towards exploration. In subsequent episodes, which become successively more stressful, the balance is tipped away from exploration towards heightened attachment behaviour. Individual differences may be assessed partly in terms of how early in the situation and how intensely and actively attachment behaviour preponderates over exploratory behaviour, but also partly in terms of the balance between attachment behaviours and antithetical behaviours, such as resisting and avoiding - a balance which will be discussed more fully later.

In a previous publication (Ainsworth and Wittig, 1969) we reported the strange-situation findings for the first 14 subjects in our sample, and our impression that individual differences were related to differences in style of mother-infant interaction throughout the first year of life. In view of the expensive and very time-consuming nature of longitudinal research, it is an attractive notion that one might in a 20-minute procedure obtain a reasonably reliable and valid assessment of the nature of the relationship that has

developed between an infant and his mother. Adequate validation of our strange-situation procedure as a test of infant-mother attachment will require a series of replicatory studies with different samples. Nevertheless, it is an obvious fitst step towards validation to appraise the degree of congruity between the strange-situation behaviour of our infant subjects and their behaviour at home in regard to the balance between exploratory and attachment behaviour, and to explore the relation between these two measures of infant behaviour and the quality of mother-infant interaction in the last quarter of the first year of life.

METHOD

A. Procedure

The room used for the strange-situation contained office furniture on one side, leaving a 9 x 9 foot square of clear floor space. At one end of the room was a child's chair with toys on it and near it. Towards the other end of the room on one side was a chair for the mother, and opposite it a chair for a stranger. The baby was put down between the mother's and stranger's chairs, facing the toys, and left free to move as he wished.

The situation consisted of eight episodes which succeeded each other in a standard order.[2] To supplement the description which follows, Table I is provided for easy reference. The first three episodes were pre-separation episodes and relatively non-stressful. Episode 1 was introductory. Episode 2 was intended maximally to elicit exploratory behaviour. The mother put the baby down in the specified place, then sat in her chair, playing a non-participant role. This and most subsequent episodes lasted 3 minutes. The

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Insert Table I about here

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first stress was introduced in episode 3 with the entrance of a female stranger, who sat in her chair quietly for a minute, conversed with the mother for a minute, and then gradually approached the baby, inviting him to play with a toy which she offered him.

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2 The following materials have been deposited with the National Auxiliary Publications Service: instructions for conducting the strange-situation procedure, instructions to the mother, instructions for coding behaviours for frequency measures, and instructions for coding socially interactive behaviours. Order NAPS document 00762 for ASIS National Auxiliary Publications Service, c/o CMM Information Sciences, Inc., 22 West 34th Street, New York, New York 10001, remitting $3.00 for microfiche or $1.00 for photocopies.

Episode 4, the first separation episode, began with the unobtrusive departure of the mother. If the baby continued his exploratory play, the stranger did not participate; otherwise she tried to interest him in the toys, to see whether exploratory behaviour could be sustained in the mother's absence. If, however, the baby was much distressed, the stranger tried to distract him or to comfort him, but if she was entirely unsuccessful in this, the episode was curtailed. Episode 5 was the first reunion episode. Having entered, the mother paused for a moment near the door to give the baby an opportunity to mobilize a spontaneous response, for it was expected that the separation experience would have heightened attachment behaviour and that the baby would seek proximity or contact with her. Meanwhile the stranger slipped out. The mother had been instructed to encourage the baby to play with the toys again, since we hoped to tip the balance towards exploratory behaviour again before further stress was introduced. When the baby had resumed play the mother left, pausing to say "bye-bye". In episode 6 we wished to observe the baby's response to a second separation in which he was left entirely alone. Episode 7 began with the entrance of the stranger, whose behaviour, as in episode 4, was contingent upon the baby's behaviour. Finally, in episode 8 - the second reunion episode - the mother returned, and after the reunion had been observed the situation was terminated.

The behaviour of the participants was observed from an adjoining room through a one-way vision window. Two observers dictated independent narrative accounts into a multiple-channel tape-recorder, which also picked up the click of a timer every 15 seconds. These narrative reports were subsequently transcribed and coded, and constitute the raw data. Reliability checks were made of the observation and of the coding, and were highly satisfactory. (See Ainsworth and Bell, 1970.)

B. Subjects

The main sample consisted of 23 white, middle-class mother-infant pairs, who were originally contacted through paediatricians in private practice. They had been observed longitudinally from birth onwards at home, in the course of visits lasting approximately 4 hours occurring at least every 3 weeks. They were introduced to the strange situation when the infants were 51 weeks old. The last home visit was made at 54 weeks.

A second sample of 33 mother-infant pairs was observed in the strange situation by Bell (1970) when the infants were 49 weeks old. It was combined with the main sample in a normative account of strange-situation behaviour (Ainsworth and Bell, 1970), and in the present analysis insofar as strange-situation behaviour is concerned. Since longitudinal data of infant-mother interaction in the natural home environment are not available for them, however, they cannot be included in the comparisons of strange-situation behaviour with behaviour at home.

C. Classification of Strange-situation Behaviour

The tentative classificatory system proposed by Ainsworth and Wittig (1969) for the first 14 subjects identified 3 groups - A, B, and C - which were distinguished chiefly by degree of distress in the separation episodes.

An impressionistic review of the interaction characteristic of each mother-infant dyad suggested, however, that responses to the mother in the reunion episodes rather than separation distress would be a better basis for classification, the concurrent validity of which was to be assessed in terms of usual behaviour at home. Consequently a new classificatory system was devised. As before, three main groups were identified, groups A, B, and C. In addition subgroups were specified - eight in all.

Despite an awareness of possible criticisms (and of the statistical disadvantages) of applying a fine-grained classificatory system to a small sample, the provision of subgroups seemed justified on two interrelated counts: differences in configurational patterns of behaviour among the various subgroups, and internal consistency within the subgroup. Analysis of strange-situation protocols revealed clear-cut variations in the behavioural configuration exhibited by infants within each of the three main groups. In other words, specific types of behaviours in response to the cumulative stresses of the strange situation clearly identified clusters of infants within a main group. Internal consistency of the subgroups refers to the high degree of similarity in the strange-situation behaviour of the individual members of each subgroup. Subsequently we found that infants classified in a particular subgroup resembled one another more closely than they resembled infants in other subgroups, not only with respect to the criterion behaviours but also with respect to behaviours which were not used as a basis for classification. Indeed, the subgroups emerged in general as offering a much more significant basis of classification of individual differences than did the more broadly defined main groups - but these statements anticipate our findings and hence will not be discussed further here.

The criteria for classification of the strange-situation behaviour of family-reared, white, middle-class 1-year-olds are given in full in succeeding paragraphs. This classificatory system is based mainly, although not exclusively, upon behaviours in interaction with the mother during the reunion episodes.

1. Group A. These infants show little or no tendency to seek proximity, interaction, or contact with their mothers. If picked up they show little or no tendency to cling, or to resist being released. On the contrary, they tend either to avoid the mother by ignoring her when she returns, or to mingle a welcome with avoidance responses such as turning away, moving past or away, or averting the fact.

Babies in group A show a tendency to treat the stranger much as they treat the mother, although perhaps with less avoidance. They are either not distressed during the separation episodes or distressed only when left alone.

The two subgroups of group A share the above-mentioned characteristics, but differ from each other in regard to the points listed below.

Subgroup A_1. (1) The baby either does not greet his mother upon reunion, or the greeting is limited to a mere look or smile. He either does not approach his mother at all, or the approach is abortive - i.e. he turns

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back or goes past her - or he comes only after much coaxing. He tends to ignore her throughout the reunion episodes, or, indeed, more actively to avoid her, by moving away from her or by averting his face. (2) If picked up, he does not cling; he does not resist being put down, and indeed he is likely to squirm to get down.

Subgroup A_2. (1) The baby shows a mixed response to his mother upon reunion, with some tendency to greet and to approach, intermingled with a marked tendency to turn away from, avert his face from, move past, or to ignore her. (2) If he is picked up he also shows a mixed response. He may cling momentarily, and if put down he may resist or protest momentarily, but he also tends to squirm to be put down, to turn away his face while being held, and to show other signs of mixed feelings.

2. Group B. The infants classified in group B respond to the mother's return in the reunion episodes with more than a casual greeting, although some may cry rather than smile. They show either a clear-cut desire for proximity or contact with the mother, or a wish for interaction with her, and they are active in seeking what they wish.

A group B infant may or may not be friendly with the stranger, but he is clearly more interested in interaction and/or contact with his mother than with the stranger. He may or may not be distressed during the separation episodes, but if he is distressed it is clearly attributable to his mother's absence and not merely to being alone. He may be somewhat comforted by the stranger, but it is clear that he wants his mother.

The four subgroups of group B share the above-mentioned characteristics but differ in regard to the points listed below.

Subgroup B_1. (1) When his mother returns, the baby greets her with a smile, and is interested in establishing interaction with her, although he does not especially seek proximity to her. (2) He does not especially seek contact with his mother, and if picked up he tends not to cling or resist release. (3) He shows little or no distress during the separation episodes.

Subgroup B_2. (1) When his mother returns, the baby not only greets her but he also tends to approach her and seems to want contact with her, but to a lesser extent than babies of subgroup B_3. On the other hand, he does not seek across-distance interaction with her to the extent that B_1 babies do. (2) If he is picked up by his mother he tends to accept contact, but he does not cling as strongly or resist release as conspicuously as do B_3 babies. (3) He shows little or no distress in the separation episodes.

Subgroup B_3. (1) The baby responds to his mother's return, although he may cry instead of smiling, and he tends actively to approach her. He clearly wants to be in proximity to her. (2) He actively seeks physical contact with his mother, and when contact has been achieved he tends to cling to her and strongly to resist release. (3) He may or may not be distressed in the separation episodes, but if he is not distressed when his mother is absent he is clearly more active in seeking contact and in resisting release than are babies of subgroups B_1 and B_2.

Subgroup B_4. (1) The baby obviously wants proximity to his mother not only in the reunion episodes but throughout. He differs from the other babies of group B by showing insecurity even in the pre-separation episodes. He is entirely preoccupied with his mother when she is present and explores little. (2) He actively seeks to maintain physical contact with his mother by clinging and by resisting release. (3) He is clearly disturbed in the separation episodes.

3. Group C. From the beginning group C was considered a heterogeneous group, distinguished from the other groups only by what was loosely specified as "maladaptive" behaviour. One aspect of this maladaptiveness was failure to use the mother as a secure base for exploration of the unfamiliar environment, even in episode 2 before the stresses of the stranger and of separation were introduced. Some group C babies do not explore actively even in the pre-separation episodes; others are fairly active in exploration but do not seem to enjoy it.

Two subgroups of group C were distinguished, which share the above-stated general characteristics, but which differ as follows.

Subgroup C_1. (1) The baby tends to respond positively toward his mother when she returns, perhaps with reaching, perhaps with a more active approach. (2) He is interested in contact with her and seeks to maintain it through clinging and/or resisting release, but he is highly ambivalent towards her, mingling active contact behaviour with angry, contact-resisting behaviour such as pushing away from her, hitting or kicking her, and/or pushing away or throwing down the toys through which she may attempt to mediate interaction. (3) He is distressed during the separation episodes. (4) He may explore in the pre-separation episodes but he tends to do so less enthusiastically than babies of either group A or group B, and his exploration is coloured by either anxiety or anger or both.

Subgroup C_2. (1) The baby is unable to initiate active positive behaviour in achieving proximity or interaction with his mother, even in the pre-separation episodes. He may make some abortive attempts, but these are ineffective, and he is more likely to signal than actively to approach. (2) He shows no active seeking of contact with the mother and, if contact is instituted, he tends to be ineffective in maintaining it. (3) He may or may not be highly distressed during the separation episodes. (4) Because of passivity he shows striking inability to use his mother as a secure base from which to explore.

Once the infants had been classified into the various strange-situation groups and subgroups, several analyses were conducted. The purpose of these analyses is to explore further the differences implicit in the subgroups and to ascertain whether these distinctions represent stable and meaningful individual differences. We chose to examine here four main classes of evidence in relation to the strange-situation classification: (1) the interactive criterion behaviours upon which the classification was based; (2) other strange-situation behaviours, such as exploration, crying, and search; (3) infant behaviour at home, and particularly the balance between attachment and exploratory behaviours; and (4) maternal behaviour at home.

In regard to each of these classes of evidence there are additional special procedures which must be described. Rather than segregate all procedural matters into this section, it seems preferable henceforward to intersperse procedure and findings, in the interests of clear communication of a complex and detailed body of information.

FINDINGS

A. STRANGE-SITUATION BEHAVIOUR FINDINGS

1. Strange-situation Classification

Before comparing the strange-situation groups and subgroups in regard to the four sets of variables mentioned above, let us first consider the reliability of the classificatory procedure itself and the distribution of subjects among the subgroups.

The classificatory system was established on the basis of the strange-situation responses exhibited by the 23 subjects of the main project. Later, it was applied to 33 subjects of Bell's (1970) sample. Classification of these latter subjects was undertaken independently by two judges, one of whom (MDSA) classified the strange-situation protocols with no other knowledge about the subjects. The two judges differed in regard to two infants only, and one of these was but a within-group discrepancy.

Table II shows the distribution of both samples across groups and subgroups. Group B is the largest in both samples, and subgroup B_3 is the largest subgroup. Subgroup B_3 may therefore be considered "normative" in terms of frequency, but also (as will be shown in subsequent analyses) it best approximates to the "norm" of behaviour expected on thecretical grounds. Furthermore, it is apparent that even in these two small samples the proportion of cases classified in each subgroup is roughly comparable - except

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Insert Table II about here

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for the fact that subgroup B_4 is represented only in Bell's sample.

2. Analysis of Interactive Behaviour in the Strange Situation

Classification of behaviour in the strange situation was based mainly upon a baby's response to his mother in the reunion episodes. Response to reunion may be viewed as involving four main systems of infant-mother interactive behaviours: proximity seeking, contact maintaining, proximity avoiding, and contact resisting. These systems comprehend behaviours that had been previously conceived as specific and discrete - namely approaching, greeting, clinging, and the like. For example, whereas the most clear cut

evidence of active proximity-seeking behaviour is shown when a baby quickly crosses the room to establish contact with his mother, other behaviours such as signalling by reaching or crying can constitute less active attempts to gain proximity. Once it was appreciated that quite disparate behaviours could serve the same end, and that they could be ordered in terms of the "strength" of the bahavioural system - that is, in terms of the degree of active initiative shown by the infant - it was possible to comprehend a large variety of behaviours within the scope of the above four variables.

An analysis of these four infant-mother interactive behaviours was undertaken in part to check that strange-situation subgroups, quantitatively assessed, were congruent with the original specifications for classification. First a detailed coding was undertaken, and then the codings were ordered into four seven-point scales (see page 00, note 2). Although the four behaviours in question were highlighted in the reunion episodes in particular, behaviour in the pre-separation episodes was also included in the coding and scaling. The resulting scores were used by Ainsworth and Bell (1970) to describe trends for the total sample. Here they are used to delineate the behaviours of the various subgroups, and as such, they provide a useful check on the objectivity of the classificatory procedure.

It may be seen in Fig. 1 that the weakest proximity-seeking and contact-maintaining behaviour, and the strongest proximity-avoiding behaviour, is shown by subgroup A_1, especially in the reunion episodes, episodes 5 and 8. In this it matched the specifications for classification.

Insert Fig. 1 about here

Subgroup A_2, like subgroup A_1, showed strong proximity-avoiding behaviour. Unlike A_1 babies, however, A_2 babies mixed proximity avoiding with moderately strong proximity seeking. The A_2 subgroup also mixed contact-seeking with contact-resisting behaviours.

Subgroup B_1 resembles A_1 in that it is weak in proximity seeking and in contact maintaining. These babies were clearly different from A_1 babies, however, in their interest in maintaining interaction with the mother across a distance during the reunion episodes - an interest which was not shown consistently by any other subgroup, and which is not represented in the dimensions of interactive behaviour featured in Fig. 1. Our present analysis shows that they also have fairly strong proximity-avoiding behaviour in the reunion episodes, although this was somewhat weaker than that shown by either of the subgroups of group A.

Subgroup B_2 shows strong proximity-seeking behaviour in episode 8, and also fairly strong contact-maintaining behaviour. These behaviours are

slightly stronger than those of subgroup A_2, although weaker than those shown by subgroup B_3. B_2 babies resemble B_3 babies in having weak proximity-avoiding and contact-resisting behaviour - and in these respects they differ from subgroup A_2.

Subgroup B_3 infants were strong in proximity seeking and strongest in contact maintaining in the reunion episodes, especially in episode 8. They were clearly distinguished from group A by weak proximity-avoiding behaviour, and from group C by weak contact-resisting behaviour.

Subgroup B_4 is intermediate between B_3 and the group C babies. It resembles subgroup B_3 in showing relatively strong proximity-seeking and contact-maintaining behaviour in the reunion episodes, but these babies betrayed their insecurity by showing these behaviours to a greater extent in the pre-separation episodes as well. Unlike B_3 babies, their positive response to reunion is mixed with a degree of contact-resisting behaviour.

As implied in the specifications for classification, subgroups C_1 and C_2 showed clear differences - and yet they showed one unsuspected similarity, which gives group C a point of real homogeneity. Very strong contact-resisting behaviour was shown not only by C_2 but also by C_1 babies in episode 8. Subgroup C_1 showed strong proximity-seeking behaviour in the reunion episodes but differed from B_3 and even from B_4 by showing it in episode 3 as well. Subgroup C_2, which the specifications identified as passive, showed weaker proximity seeking than C_1. C_2 babies were, however, fairly strong in contact-maintaining behaviour in episode 8, as, indeed, were C_1 babies also. It was the mingling of contact-maintaining and contact-resisting behaviour, and also its angry quality, that made group C babies seem highly ambivalent in their relations with their mothers, and, indeed, distinguished them from other subgroups.

To summarize: group A was distinguished from groups B and C by less proximity seeking and contact maintaining, and especially by more proximity avoiding. Group C was distinguished from group B by more contact resisting. Although "adjacent" subgroups tended to resemble each other more closely than they did more "distant" ones, nevertheless the analysis supported the distinctions made between them.

3. Exploratory Behaviour, Crying, and Search Behaviour

Exploratory behaviour and crying played but a limited role in the specifications of the classification of strange-situation behaviour, and search behaviour in the separation episodes was not considered at all. Nevertheless, it is of value to examine group and subgroup differences in regard to these behaviours to ascertain the extent to which they are correlated with the classifications.

It was of particular interest to determine whether subgroups varied in the extend to which they displayed the expected shift from exploration to proximity seeking. In addition, since the subgroups exhibited different

patterns of attachment behaviour upon reunion with the mother, it seemed of value to determine whether they differed also in the display of attachment behaviours during separation from the mother. Two forms of attachment behaviours likely to be evoked by the mother's departure were considered - crying, and search behaviour. Search behaviours, as defined in this study, include looking at, approaching and/or remaining by the door or the mother's chair.

A frequency measure for two kinds of exploratory behaviours (exploratory locomotion and exploratory manipulation) and for crying was obtained by counting the number of 15-second time intervals in which the behaviour in question occurred, and by prorating for episodes which were longer or shorter than the standard 3-minute episode. Precise instructions for the identification and coding of these behaviours are given elsewhere (see page 00, note 2). Search behaviour, however, was coded and then assessed on a seven-point scale comparable to those devised for the interactive behaviours discussed in an earlier section.

It may be seen from Table III that search for the absent mother tends to be substantially stronger in episode 6 when the baby was alone, than in episodes 4 and 7, when the baby may have been distracted by, or perhaps inhibited by, the presence of the stranger. Search behaviour was conspicuously

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Insert Table III about here

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weak throughout the separation episodes in the case of B_4, which had been specified as particularly helpless without the mother, and C_2 which had been specified as particularly passive. Otherwise all subgroups show roughly equal mean strength of search behaviour, although some small differences emerge in episode 7.

As shown in Fig. 2, crying was minimal in the pre-separation episodes; it occurred to an appreciable extent only in subgroups B_4 and C_1 and in episode 3 when the stranger was present. (Although we have largely omitted

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Insert Fig. 2 about here

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any account of response to the stranger in this report, it may be noted in passing that stranger anxiety occurred to any marked degree only in these two subgroups.) Subgroups B_1 and B_2 cried minimally or not at all throughout the strange situation, and indeed absence of distress in the separation episodes had been included as a specification for the classification of these subgroups. Subgroup A_1 also cried minimally or not at all. Subgroup A_2 cried minimally, except in episode 6 when they cried presumably in response to being left entirely alone. Group C infants were most conspicuous for

crying throughout the separation episodes, and for being difficult to comfort even in the reunion episodes. Subgroup B_4 infants cried about as much as Group C infants in episodes 6 and 7, but substantially less in the first separation episode, episode 4. Some of the babies in the largest, "normative" subgroup, B_3 cried in episode 4, but some did not; of those who did, some cried throughout and some only towards the end of the episode. On the occasion of a second separation (episodes 6 and 7) most of them cried, and those who had previously cried now cried sooner and harder. Thus, crying was a more typical response to separation for group B than for group A, and was most conspicuous in group C.

It is worth noting that search behaviour in the separation episodes, especially in episode 6, was strong in four subgrous (A_1, A_2, B_1, and B_2) in which crying was relatively infrequent. The implication is that attachment behaviour may be heightened by separation even in infants who show no signs of real separation distress. Thus, despite absence of separation distress, and despite relative infrequency of proximity-seeking and contact-maintaining behaviour upon reunion, it would be impossible to characterize even A_1 infants as lacking attachment to the mother.

The mean incidence of exploratory locomotion and exploratory manipulation is also shown in Fig. 2. It may be noted that the incidence of exploratory manipulation, whenever this behaviour appears at all, is always greater than the incidence of exploratory locomotion. It is not intended to compare these behaviours, however, but rather to take them together as indicative of exploratory activity.

It may be seen that the babies of all but two subgroups explored actively when they were alone with their mothers in episode 2, showing exploratory manipulation in from 8 to 10 of the 12 time intervals. The two exceptions were the babies in subgroup B_4, who had been so classified partly because they were too preoccupied with the mother to explore, and those of subgroup C_2, who had been so classified partly because they were too passive to be able to explore. Babies of subgroups A_1, A_2, B_1 and B_2 are conspicuous for maintaining exploratory activity at a fairly high level throughout all episodes of the strange situation. Subgroups B_3 and C_1, who had explored a substantial amount in episode 2 tended not only to be slowed by the presence of the stranger in episode 3, but also to explore very little from then on. This was especially the case with C_1. Finally, subgroups B_4 and C_2 explored very little throughout.

To summarize: for the "normative" subgroup, B_3, which constitutes about 40 percent of the total sample, the balance was indeed tipped in favour of exploration of the unfamiliar situation at the outset. During episode 3 they were preoccupied chiefly with visual exploration of the stranger. With the first separation episode, however, the balance was definitely tipped towards attachment behaviour - towards seeking to gain and to maintain contact and proximity with the mother. For the babies of group A and subgroups B_1 and B_2 the balance remained tipped towards exploration despite the potential stress of separation, and despite the fact that all showed some

heightening of attachment behaviour, during the actual separation if not in response to reunion. For the babies of two small subgroups (B_4 and C_2) the strange situation did not effectively evoke exploration: rather, attachment behavious (which tended to be signalling behaviour instead of active proximity seeking) was preponderant from the beginning. The babies of subgroup C_1 superficially resembled those of subgroup B_3 in that they explored substantially at first and then shifted abruptly to attachment behaviour, but there were striking qualitative differences in the affective quality of exploratory behaviour, which was mentioned above, and attachment behaviour, which was highly ambivalent in the case of C_1.

B. THE ATTACHMENT-EXPLORATION BALANCE IN HOME BEHAVIOUR

It has been shown that babies classified in different strange-situation subgroups show different configurations of attachment and exploratory behaviours. Broader significance can be attributed to strange-situation behaviour, however, only if it emerges as consistently related to characteristic behaviour in everyday life. Consequently, for those 23 subjects for whom detailed information was available, attention was directed towards analyses of infant behaviour at home in the last quarter of the first year.

The task of assessing infants' attachment-exploration balance in the home environment was extremely complex. Classification - rather than quantification - of separate behavioural dimensions again seemed best to represent the configurational quality of the behavioural phenomena. The basic concept is that a child who can use his mother as a secure base for exploration can move away from her freely, and yet tends to return to her on his own initiative from time to time, to play at her feet or to make brief contact before moving off again.

1. The Classificatory System

The classification was based on all visits in the last quarter of the first year considered together. Five main groups were identified.[3] The specifications of their classifications are summarized as follows:

Group I: The baby uses his mother as a secure base from which he can explore the world. There is a smooth balance between exploratory and attachment behaviour. (a) He can move away from his mother, even out of sight, busily interested in trying out locomotor skills or in exploring. (b) He is by no means oblivious to his mother while exploring, but keeps track of her whereabouts, even though he may not look at her frequently. He may occasionally interact with her across a distance; from time to time, he is likely to

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3 Complete specifications for this classification, as well instructions for rating the maternal behaviour variables discussed below, may be obtained upon request from the authors, at the Department of Psychology, Johns Hopkins University, Baltimore, Maryland 21218.

gravitate back to her. (c) He may seek to be picked up, but he does not necessarily want to be held more than a few moments before wanting to be put down again on the floor. Nevertheless, when held by his mother, regardless of which of them initiated the contact, he tends to show active, positive contact behaviour to her. (d) If the mother moves about from room to room he may follow her, but he tends not to be distressed by these minor everyday separations in his familiar home environment.

Group II: The baby can, on occasion, use his mother as a secure base from which he can explore, but at times the balance between exploration and attachment behaviour shows clear disturbance of quality. The disturbance seems to be in reaction to maternal behaviour, for at times there is a mismatch between the infant's wishes for contact, proximity, and/or interaction and those of his mother. (a) When the mother is accessible and non-interfering, the baby can use her as a secure base. If the mother, wanting physical contact with the baby, interrupts his play he may resist, and subsequently ignore her and avoid proximity with her. (b) Sometimes he behaves as a group I baby in regard to keeping visual tabs on his mother, interacting with her across a distance, and occasionally gravitating back to her. Sometimes his proximity- and interaction- seeking behaviour is disturbed. If the mother fails to respond to the baby's attempts to initiate interaction or contact, he tends to respond to her rebuff with greatly heightened attachment behaviour. And yet, in some instances, he may eventually return to independent exploratory play, ignoring his mother as she ignores him. He is likely to substitute determined proximity-avoiding behaviour for intermittent proximity-seeking behaviour. (c) On occasions in which baby and mother seem attuned to each other the baby may not only seek physical contact with his mother much as a group I baby does, but also respond to it positively and actively. On other occasions in which mother's and infant's contact-seeking is mismatched the baby may actively resist contact with her instead of responding positively. (d) The response to everyday separations is variable for this group. Some react with more anxiety to the mother's leaving the room than does a group I baby, but when any group II baby is in a proximity-avoiding mood he tends to ignore her comings and goings.

Group III: The baby does not seem to use his mother as a secure base. He explores very actively, but displays relatively little proximity-seeking behaviour and does not seem much concerned with his mother's whereabouts. (a) This baby explores actively and "independently". He certainly can move away from his mother, including venturing out of sight. (b) He may to some extent keep visual tabs on his mother, but tends to have a take-it-or-leave-it attitude towards her presence. He is less interactive across a distance than a group I baby, and may not respond to his mother's attempts to interact with him. He may occasionally gravitate to his mother, but this is easily discouraged if his mother does not acknowledge him. (c) More than infants of other groups, he lacks interest in being picked up; he may well squirm to get down again after very brief holding; he lacks active contact behaviour even when he accepts contact; he tends not to protest when he is put down. (d) He seems to be able to adapt himself readily to his mother's absence from the room, or even from the house. He may or may not protest momentarily at her departure and he soon resumes his own activity.

Group IV: The baby does not seem to feel that his mother is a secure base. He explores actively, and he seeks contact and/or proximity on occasion, but the balance between these two sets of behaviour is disturbed, and to a greater extent than in the case of group II. (a) He may seem often as "independent" as a group III baby, but his periods of exploratory activity tend to be relatively brief. (b) More frequently than a group III baby, he seeks proximity and/or contact with his mother, and he also does so more actively. (c) Despite the fact that he actively initiates physical contact with his mother, he does not seem to find any great pleasure in it once it is achieved. He may, indeed, be markedly ambivalent to contact with his mother, both seeking contact and strongly resisting it. (d) More frequently than babies of other groups, he keeps track of his mother's whereabouts, and is distressed if he loses track of her or if she leaves. He tends to follow her about, and may become quite distressed if he is prevented from following.

Group V: The mother does not seem to function as a secure base for the baby. He tends to be passive either in seeking proximity/contact or in exploration or in both. He tends to engage in stereotyped, repetitive, autoerotic activities. Some babies in this group are passive only intermittently, while others are strikingly passive. (a) The most highly passive seem entirely unable to engage in sustained, independent, exploratory activity, but require the mother's participation to become active, and even then show little interest in exploring the properties of objects. The more intermittently passive may, on occasion, seem highly independent, going into forbidden areas and ignoring mother's prohibitions. This play, although seemingly independent, tends to be merely locomotor, however. Physical objects are more to be chewed or sucked than to be manipulated manually. (b) Proximity seeking may occur intermittently, although some babies seem too passive to show active proximity-seeking behaviour. (c) If contact with the mother is achieved, the baby tends to accept it passively, and does not resist release when put down. Indeed the more consistently passive of the group V babies show little or no active contact seeking, merely waiting until the mother initiates contact. (d) More than infants in groups I, II, and III, the group V baby is concerned with his mother's whereabouts, although he may not display his concern either through clear signalling or through a definitely active following. (e) He engages in frequent autoerotic activity.

2. Attachment-Exploration Balance at home and Strange-situation Classification

Table IV shows the distribution of the 23 infants in our longitudinal sample in regard to both the classification of attachment-exploration balance at home and the classification of strange-situation behaviour.

Insert Table IV about here

Let us consider the match between these two classifications, gearing ourselves primarily to the classification in terms of home behaviour.

Group I. Eight infants were classified in group I, and all of these had been classified in subgroup B_3 in regard to strange-situation behaviour. This implies that 1-year-olds who can at home consistently use the mother as a secure base for exploration do so also initially in the strange situation. It also implies that babies who display a smooth balance between attachment and exploratory behaviour at home are readily tipped in the strange situation from exploration to proximity- and contact-seeking.

Group II. Four infants were classified in group II. Of these, three were classified in either subgroup B_1 or B_2 in regard to strange-situation behaviour[5], and one in B_3. This implies that babies who experienced some mismatch with their mothers in regard to the attachment-exploration balance at home, but who nevertheless could on occasion use their mothers as a secure base, tended in the strange situation to emphasize exploration somewhat at the expense of attachment behaviour, even after the stress of two minor separations from their mothers. Fig. 1 showed that the B_1 and B_2 infants also showed more proximity-avoiding behaviour in the reunion episodes than did the babies of the "normative" group, B_3. This emphasis on continuing exploration and ignoring the mother, or even rebuffing her overtures, was also apparent at home on the occasions of mismatch between the baby's wishes and his mother's.

Group III. Three infants were classified in group III; of these, two were classified in A_2 and one in B_2 in regard to strange-situation behaviour. This implies that infants who are conspicuously "independent" at home, concerned with exploratory activity substantially more than with seeking proximity and contact with the mother, behave similarly in the strange situation. In neither situation is attachment behaviour absent, but in both situations the baby can occupy himself without conspicuous distress when the mother is absent or inattentive. The strange situation did heighten attachment behaviour in the last reunion episode, and in this sense these infants responded to stress as predicted. A disturbance in the quality on their response, however, is reflected by the fact that proximity-avoiding and contact-resisting behaviours (clearly evident also at home) are mingled with proximity and contact seeking in the strange situation. This generalized statement applies equally well to the two A_2 infants and to the B_2 infant, although the latter exhibited proximity-avoiding behaviour less consistently.

Group IV. Four infants were classified in group IV. Three of these babies were classified in subgroup A_1 in regard to strange situation behaviour, and one in C_1.

The behaviour of the C_1 baby in the strange situation was entirely consistent with her behaviour at home. In both settings she was capable of exploratory play, ambivalent in interaction with her mother, and prone to acute distress in separation situations.

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5. Since only one infant in the main-project sample was classified at B_1, subgroups B_1 and B_2 are combined in this and further analyses.

The three A_1 infants presented a different picture. For them the strange situation heightened the "independent" component of their characteristic home behaviour. They explored actively in the strange situation, ignored the mother strikingly, and thus showed a "snubbing" kind of rejection. A possible explanation of their behaviour under stress will be offered in the discussion section of this chapter. It is sufficient here to point out that the strange situation, although it did not intensify all components of the behavioural configuration observed at home, highlighted a considerable degree of disturbance in the dynamics underlying the attachment-exploration balance.

Group V: Four infants were classified in group V. Of these, two were classified as C_2 in strange-situation behaviour, one as C_1, and one as A_1. Passivity, whether thoroughgoing or intermittent, was the distinguishing feature of group V. The two C_2 infants were strikingly passive both at home and in the strange situation; neither showed any substantial degree of initiative either in exploration or proximity-seeking in either environment. They also showed a substantial amount of stereotyped, "autoerotic" behaviour in both settings - sucking in one case and rocking in the other - and, indeed this was one reason for classing their behaviour as "maladaptive" in the strange situation.

The C_1 infant was intermittently passive at home - she chewed and sucked objects when left in the playpen for long periods, but was very active in locomotion on the rare occasions when she was free to move about. This behaviour was quite consistent with her strange-situation behaviour. It might be added that she was anxious about her mother's whereabouts and exceptionally fearful of strangers - both at home and in the strange situation.

Finally, the infant classified in subgroup A_1 in regard to strange-situation behaviour was particularly conspicuous for autoerotic behaviour at home - sucking, rocking, rubbing parts of his body; and even his seemingly exploratory behaviour was so stereotyped, repetitive, and compulsive that it seemed more like rocking than it did like exploration of the properties of objects. In the strange situation his "exploratory" behaviour was maintained throughout, but it was a precise replication of the stereotyped behaviour he showed at home. On the other hand, the separation anxiety he showed at home was not displayed in the strange situation.

Thus, the stresses of the strange situation highlighted certain behavioural characteristics of group V infants which were manifested in their home behaviour. Moreover, these stresses intensified, in three of the four infants, a component of the dynamics of infant-mother interaction which was not in all of them so readily detected at home - namely anger and ambivalence in response to contact.

In summary, there is an impressive degree of congruence between a baby's response to his mother in the strange situation and the quality of the attachment-exploration balance at home. It is clear that babies who have the smoothest attachment-exploration balance at home and the most positive

attachment behaviour (compare the specifications for classification in group I) show clear-cut and unambivalent attachment behaviour towards the mother after two stressful although brief separations from her in a strange environment. In cases in which there is some disruption in the smoothness of the attachment-exploration balance at home, due to a mismatch between mother and baby - as in group II - the tendency is to show less proximity- and contact-seeking with the mother after the stress of separation.

Babies who are independent at home - i.e. group III - show some heightening of proximity and contact-seeking under strange-situation stress, but also show proximity-avoiding behaviour. Those who at home alternate anxious proximity-seeking with independent behaviour - i.e. group IV - respond either with heightened ambivalence towards the mother (C_1) or with heightened "independence" defined by striking proximity-avoiding behaviour (A_1).

Finally, babies such as those of group V who are passive, autoerotic, and/or incompetent in their behaviour at home tend to show a disturbance in the quality of their exploratory behaviour in the strange situation, and heightened ambivalent reactions towards the mother.

C. MATERNAL BEHAVIOUR

An underlying hypothesis of this study is that infants who differ in regard to attachment-exploration balance have experienced different kinds of mother-infant interaction. Ainsworth and Wittig (1969) reported, on the basis of an impressionistic analysis, that group B infants (according to their tentative strange-situation classification) differed from group A and group C infants in regard to several features of mother-infant interaction. Ainsworth and Bell (1969) showed that the present strange situation classifications were significantly related to mother-infant interaction in the feeding situation during the first 3 months, and also to ratings of maternal behaviour in dimensions not specifically related to feeding. The common factor in all of these assessments seemed to be the degree of sensitivity the mother showed to the baby's signals, in noticing them, interpreting them accurately, and in responding to them promptly and appropriately. It was clear that the mothers of group B were significantly more sensitive than the mothers of group A and group C babies, but A and C mothers did not seem to be distinguished effectively by any of the assessments used.

In an attempt to identify aspects of maternal behaviour that might distinguish between A and C mothers, new rating scales were devised for the assessment of maternal behaviour during the last quarter of the first year. The dimensions which will be reported here are : acceptance-rejection, cooperation-interference, accessibility-ignoring, and, in addition, sensitivity-insensitivity - which had seemed to be the common factor in the previous analyses.

These dimensions were rated on nine-point scales, each with five anchor points clearly specified, (see page 00, note 3).

Sensitivity-insensitivity: This scale deals with the mother's response to the infant's signals and communications. The sensitive mother is able to see things from her baby's point of view. She is tuned-in to receive her baby's signals; she interprets them correctly, and she responds to them promptly and appropriately. Although she nearly always gives the baby what he seems to want, when she does not she is tactful in acknowledging his communication and in offering an acceptable alternative. She makes her responses temporally contingent upon the baby's signals and communications. The sensitive mother, by definition, cannot be rejecting, interfering, or ignoring.

The insensitive mother, on the other hand, gears her interventions and initiations of interactions almost exclusively in terms of her own wishes, moods, and activities. She tends either to distort the implications of her baby's communications, interpreting them in the light of her own wishes or defences, or not to respond to them at all.

Acceptance-rejection: This dimension refers to the balance between the mother's positive and negative feelings about her baby, and to the extent to which she has been able to integrate these conflicting feelings or to resolve the conflict between them. A highly rejecting mother frequently experiences resentful, angry, rejecting feelings which overwhelm her positive feelings towards her baby. She may openly voice her rejection, saying that he is a nuisance and interferes substantially in her life, or she may manifest her rejection by constantly opposing his wishes, or by a generally pervasive atmosphere of irritation and scolding. At the opposite pole, the accepting mother accepts infant behaviour which other mothers might find hurtful or irritating, such as angry behaviour or disregard of her overtures. She may occasionally feel irritated by his behaviour, but she does not make an opponent of him, and she cheerfully accepts the responsibility of caring for him despite the temporary limitation this places on her other activities.

Co-operation-interference: The highly interfering mother lacks respect for her baby as a separate person. She tries to impose her will on his, or to shape him to her standards, or merely follows her own whims without regard for his moods, wishes or activity-in-progress. At the positive pole is the co-operative, "co-determining" mother who respects the baby's autonomy, and plans to avoid situations in which she might have to interrupt his activity or to exert direct control over him. She interferes abruptly or forcefully only in rare emergencies. Otherwise, when she intervenes on her own initiative she is skilful in "mood-setting" and in other techniques which help her baby to feel that what she wishes is also congenial to him.

Accessibility-ignoring: The accessible mother's attention is nearly always tuned-in to the baby, so that she can perceive his signals and communications both when he is near and when he is in another room by himself. This mother can attend to his communications despite distraction by other demands, activities, and interests. At the negative pole, the mother is often so preoccupied with her own thoughts and activities that she does not even notice the baby, let alone acknowledge his signals. When he is elsewhere

she seems to forget that he exists, and his sounds do not seem to filter through to her. She seems to notice him only when she deliberately turns her attention to do something to or for him, making a project of it.

These four dimensions were rated separately for each visit during the last quarter of the first year. Five judges participated, three of them working without knowledge of any other assessments. Precautions were taken to avoid halo effects across variables. The final rating was decided upon in conference, and was almost invariably the median rating for all visits rated. Reliability coefficients between pairs of judges were determined. The mean coefficients for all pairings for each of the scales are as follows: sensitivity-insensitivity 0.89, acceptance-rejection 0.88, co-operation-interference 0.86, and accessibility-ignoring 0.87.

As expected, the sensitivity-insensitivity scale was highly correlated with the other three scales (see Table V). Acceptance-rejection was highly

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Insert Table V about here

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correlated with co-operation- interference and also, to a somewhat lower degree, with accesibility-ignoring. The lowest correlation was between co-operation-interference and accesibility-ignoring, and even that was moderately and significantly positive. An examination of scatter diagrams made it clear that all four variables were closely related at the positive end, while the scatter of scores fanned out to a greater or lesser extent at the negative end. Thus, for example, co-operative mothers are accessible, but interfering mothers are not necessarily ignoring, and vice-versa.

The means of each of the strange-situation subgroups on each of the four maternal behaviour measures are shown in Fig. 3. On each scale the mothers of B_3 babies receive the highest mean rating, and on each the mothers of the B_1 and B_2 infants come next. This consistency is reflected by a coefficient of concordance significant at beyond the 0.01 level.

Insert Fig. 3 about here

As anticipated, the sensitivity-insensitivity dimension yielded no differentiation between the mothers of group A and group C babies. In regard to the other scales, we were successful in obtaining some differentiation between the A and C subgroups. Group A mothers - and especially A_1 mothers - are more rejecting than are group C mothers. A_1 and C_1 mothers

are the most interfering, and $\underline{A}_2$ and $\underline{C}_2$ mothers are the most inaccessible and ignoring. Thus the various strange-situation subgroups differ in regard to maternal behaviour and, consequently, in regard to characteristic mother-infant interaction.

The mothers of $\underline{B}_3$ babies are clearly the most sensitive - responsive to the baby's signals and capable of perceiving things from his point of view. They are also accessible, accepting, and non-interfering. The $\underline{B}_3$ mother respects her baby as a separate person; she also respects his activity-in-progress and thus avoids interrupting him. She accepts his exploratory behaviour, which leads him away from her just as she accepts his desire for contact and interaction which leads him to her.

The mothers of $\underline{B}_1$ and $\underline{B}_2$ babies are, in regard to each of the four dimensions of behaviour, intermediate between the $\underline{B}_3$ mothers and the mothers of groups A and C. They may be described as inconsistently sensitive. For reasons which differed in each case they were also inconsistently accessible to the baby; there were distinct periods during which he was given much attention. During the periods of attention three of the four mothers were somewhat interfering, tending to interrupt exploratory play. Indeed, in two cases there was clear mismatch in regard to desire for physical contact; the mothers sometimes interrupted the baby to give him cuddling when he did not wish it, only to be rejecting or perfunctory at other times when the baby himself sought contact.

The mothers of $\underline{A}_1$ babies were not only highly insensitive but are also more rejecting and interfering than the mothers of any other subgroup. They were quite unable to see things from the baby's point of view or to be guided by the baby's display of initiative. They did not so much ignore the baby's communications as discount them as relevant guidelines, and thus were very arbitrary in their interventions.

The mothers of $\underline{A}_2$ babies were not only highly insensitive but also inaccessible for prolonged periods. They were impatient with the role of housewife and mother, and found other activities to occupy them both at home and away from home. When at home they could go in and out of a room, preoccupied with other thoughts, and not even acknowledge the baby's existence. Only if the baby's signals were strong and persistent enough would they finally respond. Because of their inattentiveness to the baby they were infrequently interfering, although they were not co-operative and co-determining. They were somewhat rejecting, however, in the sense that the baby tended to be rejected along with the maternal role.

The mothers of $\underline{C}_2$ babies were also highly inaccessible and ignoring. They differed from the $\underline{A}_2$ mothers in that they had a strong emotional investment in the maternal role. They were severely disturbed women, very fragmented in their behaviour, and although they gloried in being mothers, they found a baby's demands anxiety-provoking. In order to hold themselves together and to carry on their routine activities they had to ignore the baby, and to "tune-out" his crying. This ignoring was even more extreme during the first quarter-year than it was in the last quarter-year when these ratings were made.

They left the baby in a crib, alone in a room, to cry for prolonged periods. When the C_2 mother finally did intervene, the intervention was absolutely non-contingent upon the infant's signals. It is this arbitrary quality of response that distinguishes the inaccessible C_2 mothers from the inaccessible A_2 mothers. It is thus not surprising that the C_2 babies behaved extremely passively and "maladaptively" both in the strange situation and at home, whereas A_2 babies, whose strong, persistent signals finally brought a response, developed active, although "defensive" behaviours to cope with the mother and with the environment.

The mothers of C_1 babies were disparate except for the fact that both were highly insensitive. One was highly interfering but differed from the A_1 mothers in that she was not rejecting. She was well-meaning but continually interrupted her daughter to train her, to show off her accomplishments, and to gratify her own desires to be playful and affectionate. She was "at" the baby so much of the time that she was in fact highly controlling. The other C_1 mother was compulsive, much preoccupied, and quite unresponsive to any signals from the baby that she did not interpret as emergency signals. Consequently she obtained a low rating on accessibility. Although both little girls behaved similarly in the strange situation, the background of mother-infant interaction differed, and to a much greater extent than in the case of any other subgroup.

CONCLUSIONS

Let us recapitulate these complex findings, and venture some hypotheses about the dynamics which may account for the fact that there is a notable degree of clustering of maternal and infant behaviours common to the several assessment procedures used.

First, mothers who are sensitive to their babies' signals tend to be also accessible, co-operative, and accepting. At home their babies engage in secure-base behaviour and tend not to be disturbed by minor everyday separations. In the strange situation these babies behave at first as they do at home, using the mother as a secure base from which to explore. The successive stresses of the strange situations, however, reduce their exploratory play and heighten attachment behaviour, and most (but not all) of them evince distress in the separation episodes. This pattern of mother-infant interaction associated with maternal sensitivity is considered to be the normal, healthy pattern of infants toward the end of the first year of life; it was displayed by about one-third of the sample.

To the extent that infants and their mothers depart from the above-described normative behaviour, individual differences become more conspicuous, the classificatory groups become smaller, and it becomes somewhat more difficult to generalize. Nevertheless, there is a second group of mother-infant pairs who approximate to the normative pattern in many ways and whose deviations therefrom show a fair degree of homogeneity. The mothers may be described as inconsistently sensitive to their babies' signals and communications. All of

them tend to have lacunae in their accessibility to their babies; and most of them tend on occasion to be interfering. The baby may respond to his mother's inconsistency by behaviour geared situationally to the variations in her behaviour - sometimes using her as a secure base from which to explore, at other times exploring independently and avoiding his mother. At still other times especially in response to maternal rebuff, his attachment behaviour is importunate. In the strange situation, these babies use the mother as a secure base at first, but differ from the normative group in that they maintain exploration at a fairly high level throughout all episodes, as though the independence they sometimes showed at home is used defensively to meet the stresses of the strange situation, and they respond to reunion with less heightening of attachment behaviour. These infant-mother pairs seem clearly intermediate between the normative group and the rest of the sample.

The remainder of the sample is characterized by insensitive mothering. Despite the fact that there is much more variation in patterns of interaction in these infant-mother pairs than among those with more sensitive mothering there are nevertheless some consistent clusters which suggest hypotheses about their underlying dynamics.

This set of hypotheses stems from the observation that babies who show both minimal distress in the separation episodes of the strange situation and striking proximity-avoiding behaviour in the reunion episodes - group A - have the most rejecting mothers. In contrast, babies who are both highly distressed in the separation episodes and markedly ambivalent to their mothers upon reunion - group C - are not conspicuously rejected by their mothers, although the mother-infant relationship is clearly unharmonious. This suggests that a baby who has been rejected by his mother has readily available to him defensive reactions against the kind of stresses he encounters in the strange situation - defences which are not available to other infants. Specifically, our findings lead us to two interrelated hypotheses: (1) that a disharmonious or unsatisfactory relationship with his mother evokes insecurity in the infant - an insecurity which generally manifests itself in heightened proximity and contact seeking as well as a low threshold to separation distress; such insecurity is commonly labelled separation anxiety; (2) that, since rejection entails a history of painful experiences associated with contact and with contact seeking, an infant who is conspicuously rejected not only experiences the insecurity evoked by a disharmonious relationship with his mother but also experiences conflict between heightened proximity and contact seeking and a desire to avoid proximity and contact - a conflict which engenders the development of defensive reactions. These defensive reactions channel the baby's activity towards independent play, which absorbs him and allays his insecurity and at the same time blocks his proximity-seeking behaviour.

These hypotheses seem to account for the complex relationship between infant behaviour at home and in the strange situation. Let us examine first the findings which support the second hypothesis. Mothers who both rejected and ignored their infants, but who were not conspicuously interfering - such as those of subgroup A_2 - had infants who seemed to have learned to turn

away from the mother and to absorb themselves in independent activity. They seemed to use exploratory play as a substitute for maternal attention both at home and in the strange situation. At home they were absorbed in play to the point of entirely ignoring the mother for prolonged periods when she was unresponsive. In the strange situation, they were minimally distressed by her absence and maintained their exploration throughout. Although the cumulative stress of the separation episodes heightened attachment behaviour in some measure, it also exacerbated defensive independence as manifested in proximity-avoiding and contact-resisting behaviours directed towards the mother upon reunion. Thus, when introduced to a situation which increased insecurity these infants relied largely on their own activities and avoided turning to the mother. To be so readily available to a baby in the strange situation, this defence must have already developed as a way of coping with insecure feelings aroused by a mother who ignored and rejected him at home.

There was another group of highly rejecting mothers - those of subgroup A_1 babies. In contrast to those of subgroup A_2 they were not conspicuously ignoring, but they were highly interfering. It was characteristic of them constantly to interrupt the baby's exploratory activity. Their own initiation of physical contact was therefore unpleasantly intrusive, and they tended to respond perfunctorily or even punitively to the baby's initiations of contact. At home their babies tended to play independently at times and to ignore the mother - much like A_2 infants - but at other times they sought proximity actively and somewhat anxiously, especially if the mother left the room. In the strange situation, however, when the mother was constrained to a non-interventive role, the A_1 infant maintained his exploration throughout, showing no distress upon separation and markedly ignoring his mother upon reunion. At home it seems likely that his independent activity was so frequently disrupted that he could use defensive exploration and proximity avoiding in only a fragmentary way. The defence became fully operative, however, when he was introduced to an insecurity-provoking situation in which his mother was non-interfering.

Elsewhere (Ainsworth and Bell, 1970) we interpreted proximity-avoiding behaviour as a primitive form of defence, that resembles the repressive defence Bowlby (e.g. 1960) has termed "detachment", that occurs in the course of longer separations and is conspicuous in many children when first reunited with their mothers. It was hypothesized that this defence is homologous to a response shown by infants during the extinction period of experiments on the conditioning of attachment behaviour, in which the infant looks away from, instead of responding to, a stimulus object that had previously been rewarding (cf. Brackbill, 1958; Rheingold et al., 1959). Here we further maintain that proximity-avoiding behaviour is a defensive reaction against the insecurity inherent in a disharmonious mother-infant relationship. Such a response may be viewed as an active behaviour, incompatible with and blocking attachment behaviour, which develops as a result of a history of unsatisfactory proximity- and contact-seeking experiences with a rejecting mother.

Further support for our hypothesis is provided by the behaviour of those babies who experienced a disharmonious relationship with the mother, but who were not conspicuously rejected - namely group C. Mothers of group C babies

were insensitive, and either grossly ignoring or interfering. All interacted playfully and affectionately with the baby on occasion, however, and tended neither to react punitively towards him nor to rebuff him actively. The infants were especially vulnerable to the stresses of the strange situation, and showed a conspicuous lack of defensive proximity-avoiding behaviour and of sustained independent exploration.

Non-rejecting mothers who were highly interfering in the baby's exploration - those of subgroup C_1 - (one of whom was intermittently ignoring as well) had babies who displayed greater insecurity both at home and in the strange situation than any other infants in the sample. They were fussy at home, in fact by 1 year of age they had the highest incidence of crying in the sample and in the strange situation they were clearly ambivalent towards contact with the mother.

Non-rejecting mothers who were grossly ignoring - those of subgroup C_2 - had infants who were extremely passive and easily distressed both at home and in the strange environment. Infants in this subgroup experienced no consistent feedback to their signals and were given little opportunity to explore and to gain feedback by learning to control inanimate objects. Consequently, they were strikingly passive and tended to engage in excessive autoerotic behaviour. They were highly distressed in the strange situation and could cope neither with the opportunity to explore nor with the successive stresses. Upon reunion with the mother, they showed fairly strong attachment behaviour, limited somewhat by their pervasive passivity, but, like the C_1 babies, they also displayed angry contact-resisting behaviours more conspicuously than at home.

Thus infants who had a disharmonious relationship with a mother who is not openly rejecting show signs of acute insecurity. In addition, they react to stress with heightened ambivalence to the mother. It seems that these infants, lacking the defensive reactions of rejected babies, still turn to the mother under stress. Frustrated in their expectation of finding solace and security in the attachment relationship, however, they attack the mother angrily in a futile expression of their distress.

Let us summarize our hypotheses about the relation between strange-situation behaviour and the dynamics of mother-infant interaction. To the extent that the mother has been sensitively responsive to the baby's communications and mother-infant interaction has been characteristically harmonious, the baby is able to use his mother as a secure base from which to explore even an unfamiliar situation, but responds to the stress introduced by the separation episodes with heightened attachment behaviour, relatively uncomplicated by ambivalence and not blocked by competing, defensive, proximity-avoiding behaviour. To the extent that a baby's interaction with his mother has been characteristically disturbed by her rejection of him, he responds to the stresses of the strange situation with defensive proximity-avoiding behaviour, which competes with and tends to block off attachment behaviour. To the extend that mother-infant interaction has been made disharmonious through maternal interference or ignoring, but in which

maternal rejection is either moderate or very masked, a baby seems unable to defend himself, reacting with great distress in the separation episodes and with ambivalence to his mother in the reunion episodes. This corpus of hypotheses, although derived from a small sample, promises breadth of applicability to other samples despite the fact that they may well include constellations of mother-infant interaction not comprehended here.

Insofar as there is a single quantifiable dimension of mother-infant interaction implicit in our hypotheses, this is a crude one of harmony-disharmony, with the implication that towards the disharmonious pole qualitative differences are so great that it is difficult to order them magnitudinally, let alone quantify them.

The considerations raised in this discussion should clarify our reasons for opposing the use of a dimension of strength or intensity of infant-mother attachment (e.g. Ainsworth, 1969, and in press) at least in the present state of our knowledge. Attachment behaviour, to be sure may be perceived as stronger or weaker, and the degree of strength may be seen to vary situationally. It tends to be heightened by the stresses of the strange situation, but different attachment behaviours seem to be affected differentially according to the constellations of interaction characteristic of an infant-mother pair. If proximity-seeking and contact-maintaining behaviour are taken as criteria of the strength of attachment, then the infants of subgroups C_1, B_2, B_3, and B_4 would be judged strongly attached and subgroups A_1 and B_1 very weakly attached. In terms of crying and separation distress, the infants of subgroups C_1, C_2 and B_4 would be judged strongly attached, and those of subgroup B_2 as well at A_1 and B_1 very weakly attached. in terms of active search during the separation episodes the babies of A_1, A_2, B_1, and B_2 would be judged strongly attached, and those of C_2 and B_4 weakly attached. Judgements in terms of home behaviour would arrange the infants in different orders again. According to no single criterion, whether applied to strange-situation behaviour or home behaviour, would the eight infants classified in Group I and subgroup B_3 be distinguished as the normative, healthy group which we are convinced they are. Our conclusion is that the infants of no subgroup may be assumed to be either more strongly attached or more weakly attached than the infants of other subgroups. On the contray, the evidence suggests that the infants of each subgroup are attached to their mothers in their own fashion, and that the qualitative flavour of the attachment relationship overrides in significance the notion of "strength of attachment."

We believe that the strange situation holds great promise as a kind of test situation from which inferences may be made about the quality of the infant-mother attachment relationship and about the characteristic harmony or disharmony of mother-infant interaction. One of us (Bell, 1970) has already used it successfully in this way. Much more research is obviously required both to replicate and confirm our findings. It is not known, for instance, how much resemblance our data might bear to the findings for other age groups, or groups from other cultures, nor how applicable our hypotheses might be to these other groups. It might turn out, for example,

that a normative group of 3-year-olds should be classed in subgroups B_1 or B_2 rather than in B_3, and that at that age such strange-situation behaviour might well reflect an optimum attachment-exploration balance rather than the "mismatch" by B_1 of B_2 behaviour in 1-year-olds.

In regard to replication studies, care must be taken not to assume that behaviour variables which have similar or identical labels are in fact the same. Thus, for example, proximity-seeking behaviour has been here defined in terms of the active initiative taken by the child in approaching his mother and making contact with her, and not, as in other studies, in terms of the mean distance maintained between infant and mother, or by the proportion of time spent near the mother or further away. Conclusions may differ from one study to another merely because of differences in procedural details. Obviously, if our classificatory system or behavioural dimensions are to be of use to others as indices and criteria, the procedural details upon which our findings are based should be replicated.

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Table I

Summary of Strange-situation Procedure

Episodes	Participants	Duration	Behavior highlighted by Episode
1	Mother, baby & experimenter	30 sec. approx.	(Introductory)
2	Mother & baby	3 minutes	Exploration of strange environment with mother present
3	Stranger, mother & baby	3 minutes	Response to stranger with mother present
4	Stranger & baby	3 minutes*	Response to separation with stranger present
5	Mother & baby	variable	Response to reunion with the mother
6	Baby alone	3 minutes*	Response to separation when left alone
7	Stranger & baby	3 minutes*	Response to continuing separation, and to stranger after having been left alone
8	Mother & baby	variable	Response to second reunion with mother

*Episode was curtailed if the baby was highly distressed

Table II

Distribution of Cases among Strange-Situation Classification

Subgroups	Main Project Sample	Bell's Sample	Totals
A_1	4	3	7
A_2	2	2	4
B_1	1	3	4
B_2	3	4	7
B_3	9	14	23
B_4	0	3	3
C_1	2	2	4
C_2	2	2	4
Totals	23	33	56

Table III

Mean strength of search behavior in separation episodes for each strange-situation subgroup

Subgroups	Episodes		
	4	6	7
A_1	2.9	5.4	2.7
A_2	3.0	5.0	2.3
B_1	2.5	5.0	3.7
B_2	3.6	6.0	3.3
B_3	3.2	4.5	2.7
B_4	1.3	3.3	1.7
C_1	3.3	4.5	1.2
C_2	2.0	2.3	2.0

Table IV

Classification of Strange-situation Behavior and Classification of Attachment-Exploration Balance in Behavior at Home

Attachment-Exploration Balance at Home	Strange-situation Behavior Classification						
Groups	B_3	B_1/B_2	A_2	A_1	C_1	C_2	Totals
I	8	-	-	-	-	-	8
II	1	3	-	-	-	-	4
III	-	1	2	-	-	-	3
IV	-	-	-	3	1	-	4
V	-	-	-	1	1	2	4
Totals	9	4	2	4	2	2	23

Table V

Intercorrelations among ratings of Maternal Behavior

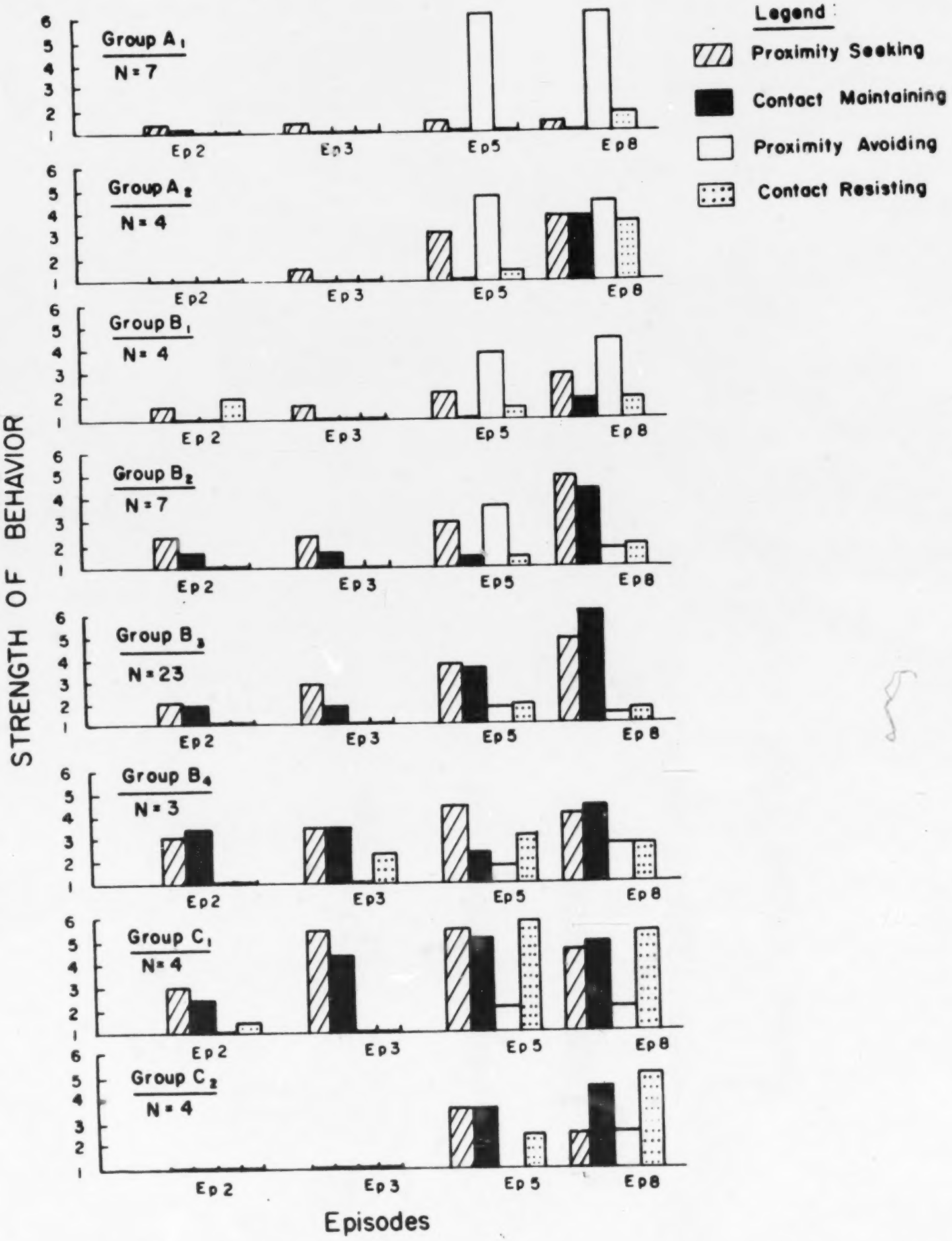
	Acceptance-Rejection	Cooperation-Interference	Accessibility-Ignoring
Sensitivity-Insensitivity	.89	.86	.82
Acceptance-Rejection		.89	.70
Cooperation-Interference			.57

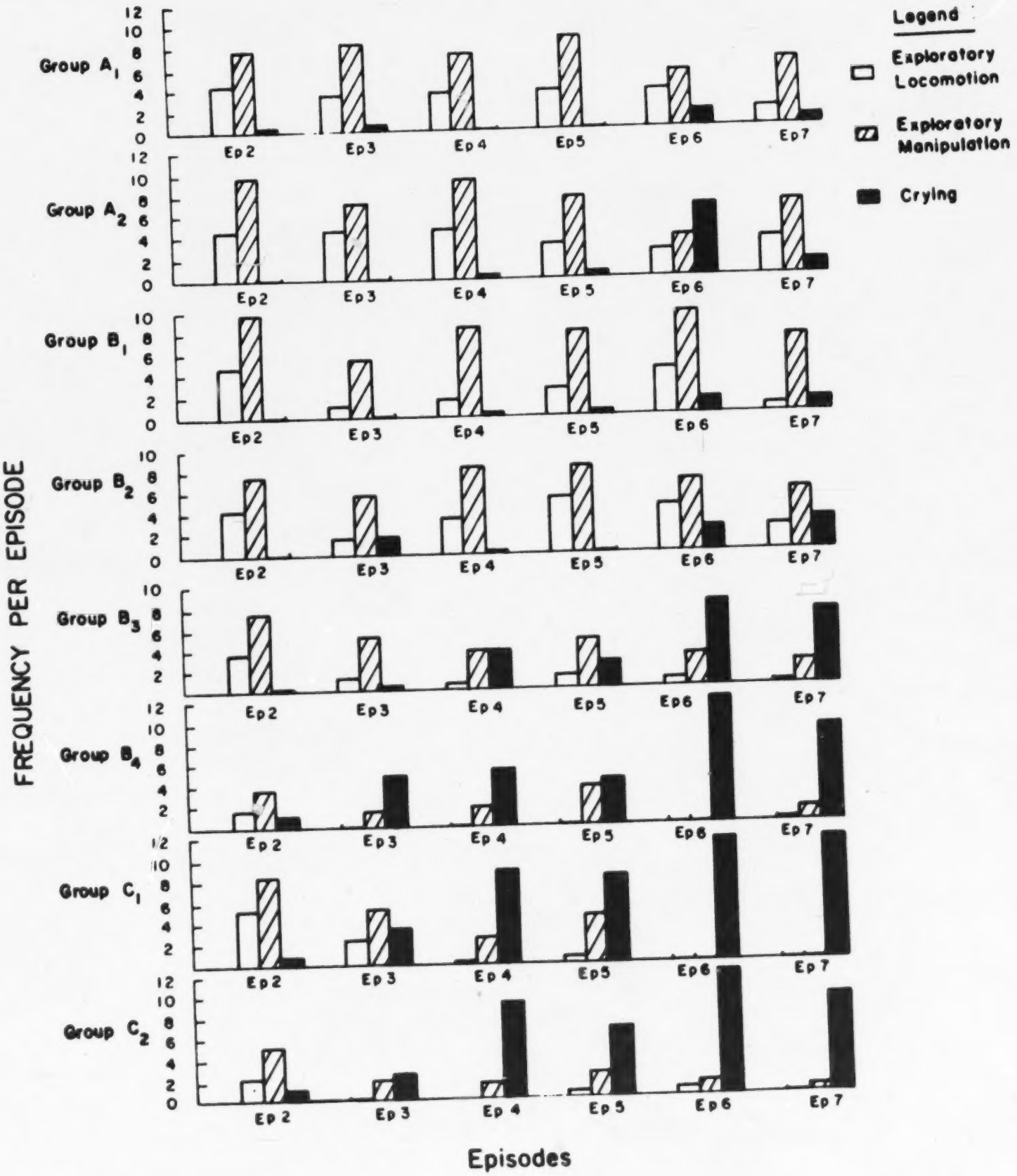
FIGURE CAPTIONS

Figure 1. Strength of interactive behaviors per episode for strange-situation subgroups.

Figure 2. Frequency of exploratory behavior and crying per episode for strange-situation subgroups.

Figure 3. Mean ratings of strange-situation groups regarding maternal behavior during last quarter.


Legend
Proximity Seeking
Contact Maintaining
Proximity Avoiding
Contact Resisting
Group A1
N = 7
Group A2
N = 4
Group B1
N = 4
Group B2
N = 7
Group B3
N = 23
Group B4
N = 3
Group C1
N = 4
Group C2
N = 4
Ep 2
Ep 3
Ep 5
Ep 8
STRENGTH OF BEHAVIOR
Episodes


Legend
Exploratory Locomotion
Exploratory Manipulation
Crying
Group A1
Group A2
Group B1
Group B2
Group B3
Group B4
Group C1
Group C2
FREQUENCY PER EPISODE
Episodes
Ep2
Ep3
Ep4
Ep5
Ep6
Ep7

MEAN RATINGS OF STRANGE–SITUATION GROUPS RE MATERNAL BEHAVIOR DURING LAST QUARTER